

Remarks:

This amendment is submitted in an earnest effort to advance this case to issue without delay.

The specification has been amended to eliminate some minor obvious errors. In addition the German word "Tank", which was incorrectly translated as "sump" has been corrected to "tank," and the inaccurate translation of "festgelegten Druck" as "defined pressure" has been changed to the correct "fixed pressure."

The drawing has also been amended to show the two recited controllers. No new matter whatsoever has been added.

Before going into a discussion of the amended claims and the art, it is important to clarify the invention. It is a simplified method of operating a tube-extruding press, where, instead of providing a complex heavy-duty pressure-control valve between a pump and the ring compartment to control the pressure holds the mandrel back and prevents it from being pulled into the die along with the material being extruded, the pump simply outputs a pressure that is significantly more than the pressure that would normally be applied to hold back the mandrel. This is what is meant by the phrase from original claim 1 "a further pumping volume is added to the previously computed pump conveying volume."

Thus the main pump is operating continuously and the mandrel position is controlled according to the invention by bleeding off excess pressure to the tank 17. This means that, rather than having to control a massive amount of pressure passing through a pressure-control valve between the pump and the front ring compartment, the pump is essentially directly connected to the front ring compartment (the valve 14 merely being used to retract the mandrel between operation cycles) and a relatively small control valve 16 is used to relieve the small amount of excess pressure. The pump 11 does not have to work against the back pressure of a pressure-control valve, and the mandrel's movement is controlled with extreme sensitivity and accuracy by a relatively modest piece of equipment dealing only with a small fraction of the pressure and liquid.

Thus the translated claims have been replaced with a set of US-style claims. New claim 1 thus recites a method of operating a tube-extrusion press having as shown in the drawing:

a die 3 having a cavity;

a holder 5 for pressing a billet 4 forward through the die 3;

a mandrel 10 shiftable forward and backward and having a front end positionable in the die 3, whereby the billet 4 pressed into the die 3 around the mandrel 10 is deformed into a tube;

a hydraulic cylinder 8 having a piston 9 connected to the mandrel 10 and shiftable therewith, the cylinder 8 defining a front ring compartment 12 between the piston 9 and the die 3 and a rear compartment 18; a pump 11 for supplying pressure to the cylinder 8; and a tank 17 connectable to the cylinder 8,  
the method comprising the steps of:

operating the pump 11 such that it supplies a pressure in excess of what is needed to prevent forward movement of the mandrel 10 into the die 3 during extrusion;  
and

bleeding pressure from the front compartment 12 through a control valve 16 to a tank 17 to control the position of the mandrel 10 relative to the die 3.

US 3,709,013 of Petsch, which was cited by WIPO against the parent case and identified in the original application papers, shows a pump 16 connected through a complex spool-type pressure control valve (see FIGS. 5 and 6) and a valve 19 with the chamber 13a. This therefore represents the exact state of the art where the pressure is regulated in the traditional manner.

US 3,950,979 of Fuchs is also significantly different from what is now claimed. Here the cylinders 10 and 27 are pressurized as described in column 4, lines 12-16 to shift the plates 9 and 12

relative to each other. Again there is no teaching of applying a standard overpressure and bleeding off the excess to control mandrel position.

US 3,180,124 of Robra is wholly cumulative to Petsch. It has a number of connections and valves permitting liquid to be admitted to and drained from the cylinder 8, but nowhere teaches the simple method this invention whereby a fixed overpressure is always supplied and the mandrel position is controlled by bleeding off a small amount of this overpressure. Here the compartment 16 is pressurized from a high-pressure source 24 via lines 21, 22 and 23 having a control valve 50 (column 3, lines 53-63 and 73). The line 23 is also connected via valves 51 and 57 to a low-pressure tank 25 that is fed from a pump 26. The flow out of the tank 25 passes through the lines 21 and 21 not to the front ring compartment, but to the back compartment of the cylinder 8. This is an altogether different system of operation.

The instant invention as defined in the new claims is therefore patentable over the cited art under §102 and §103. Notice to that effect is earnestly solicited.

If only minor problems that could be corrected by means of a telephone conference stand in the way of allowance of this case,

the examiner is invited to call the undersigned to make the necessary corrections.

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